

REPLY (ARGUMENT)

1) The following opinions were expressed in the Response dated December 14, 2004 issued by the PCT International Searching Authority.

A) The invention pertaining to claims 1 and 2 possesses novelty but lacks
5 inventive step. As the reason for this, the Examiner is indicating that "Document 1 cited in the International Search Report describes a copper foil in which 'blackening treatment' is performed to one side of the copper foil, wherein the copper foil has 'minimal deterioration in contrast', 'reflectivity of 5% or less', and a 'blackened layer' that can be 'etched easily'. And it would have been a matter of design for
10 those skilled in the art to suitably change the color difference of black in the 'blackened layer' for obtaining a copper foil having 'minimal deterioration in contrast', 'reflectivity of 5% or less', and which can be 'etched easily'. Document 2 describes a "display filter" in which the 'chroma' is '10 or less' in order to obtain a "suitable effect for preventing reflected light". Since Document 1 and Document 2
15 are 'common in that they both possess the function of controlling the reflected light', the present invention could have been easily achieved by applying the 'chroma' of Document 2 to the 'copper foil' of Document 1."

B) Similarly, with respect to the invention pertaining to claim 3, the Examiner is indicating that "Document 1 describes the 'surface roughness Ra of the surface to
20 be 0.02 to $1\mu\text{m}$ ', and it would have been easy for those skilled in the art to suitably change the other surface roughnesses to achieve the present invention".

C) Similarly, with respect to the invention pertaining to claim 4, the Examiner is indicating that "since Document 1 describes a 'blackened layer subject to a Co-Cu alloy plating process, the present invention lacks inventive step".

D) Similarly, with respect to the invention pertaining to claims 5 to 8, the
25 Examiner is indicating that "it would have been easy for those skilled in the art to suitably change the plating material and mass of deposit per unit area to achieve the present invention".

E) Similarly, with respect to the invention pertaining to claim 9, the Examiner is
30 indicating that "since Document 1 describes that the copper foil is an electrolytic

copper foil of 5 to 20 μ m, the present invention lacks inventive step".

F) Similarly, with respect to the invention pertaining to claims 10 and 11, the Examiner is indicating that "since Document 1 describes the performing rust prevention processing on the blackened layer which is chromate filming, the present invention lacks inventive step".

G) Similarly, with respect to the invention pertaining to claim 12, the Examiner is indicating that since "Document 1 describes that the copper foil is for use in a plasma display, the present invention lacks inventive step".

Incidentally, the cited Documents are the following Documents 1 and 2.

Document 1: JP2003-318596

Document 2: JP2002-341783

2) Scope of claims in the present invention has been amended as follows in order to clearly differentiate the differences with the cited Documents.

(Claims)

[1] (Amended) A copper foil with a blackened surface or layer wherein one or both surfaces of a copper foil is subject to black treatment, and having a color difference $\Delta L^* \leq -70$ and chroma $C^* \leq 15$ of a black-treated surface when measured by a color difference meter represented by black; $\Delta L^* = -100$, white; $\Delta L^* = 0$, the coarsened grains of a processed surface in which one or both surfaces of a copper foil is subject to black treatment is 1 μ m or less, surface roughness Ra of said surface is 0.5 μ m or less, Rt is 4.0 μ m or less, and Rz is 3.5 μ m or less.

[2] The copper foil with a blackened surface or layer according to claim 1, wherein one or both surfaces of a copper foil is subject to black treatment, and the surface subject to black treatment has a glossiness ≤ 15 .

[3] (Deleted)

[4] (Amended) The copper foil with a blackened surface or layer according to claim 1 or claim 2 having a black processed surface coated with at least one or more types selected from Co, Ni-Cu, Co-Cu and Ni-Co-Cu by electro plating.

[5] The copper foil with a blackened surface or layer according to claim 4,

wherein the Ni mass of deposit per unit area in the Ni-Cu plating process is 200 to 1000mg/m², or the Ni + Co mass of deposit per unit area of a plated surface subject to the Ni or Ni-Co plating process after the Ni-Cu plating process is 250 to 1500mg/m².

5 [6] The copper foil with a blackened surface or layer according to claim 4, wherein the Ni + Co mass of deposit per unit area in the Ni-Co-Cu plating process is 130 to 1000mg/m², or the Ni + Co mass of deposit per unit area of a plated surface subject to the Ni or Ni-Co plating process after the Ni-Co-Cu plating process is 250 to 1500mg/m².

10 [7] The copper foil with a blackened surface or layer according to claim 4, wherein the Co mass of deposit per unit area in the Co-Cu plating process is 300 to 1000mg/m², or the Ni + Co mass of deposit per unit area of a plated surface subject to the Ni or Ni-Co plating process after the Co-Cu plating process is 350 to 1500mg/m².

15 [8] The copper foil with a blackened surface or layer according to claim 4, wherein the Co mass of deposit per unit area in the Co plating process is 1000 to 5000mg/m², or the Ni + Co mass of deposit per unit area of a plated surface subject to the Ni or Ni-Co plating process after the Co plating process is 1050 to 2000mg/m².

20 [9] (Amended) The copper foil with a blackened surface or layer according to any one of claims 1, 2, 4 to 8, wherein the copper foil is an electrolytic copper foil or rolled copper foil of 8 to 18μm.

[10] (Amended) The copper foil with a blackened surface or layer according to any one of claims 1, 2, 4 to 9, further comprising a rust prevention processed layer
25 on the layer subject to black treatment.

[11] The copper foil with a blackened surface or layer according to claim 10, wherein the rust prevention processed layer is one or more types selected from Cr, Zn, Zn-Ni and Zn-Ni-P.

[12] (Amended) The copper foil with a blackened surface or layer according to
30 any one of claims 1, 2, 4 to 11, wherein said copper foil is a plasma display copper

foil.

(Underlined portions are the amendments)

3) The difference between the present invention and the cited Documents is clear, and the novelty and inventive step of the present invention cannot be denied based on the cited Documents. The reason for this explained below. Incidentally, the invention of claim 2 onward is dependent on claim 1, and the explanation will be centered around claim 1 possessing novelty and inventive step.

A) The invention of claim 1 relates to a "copper foil with a blackened surface or layer wherein one or both surfaces of a copper foil is subject to black treatment, and having a color difference $\Delta L^* \leq -70$ and chroma $C^* \leq 15$ of a black-treated surface when measured by a color difference meter represented by black; $\Delta L^* = -100$, white; $\Delta L^* = 0$, the coarsened grains of a processed surface in which one or both surfaces of a copper foil is subject to black treatment is $1\mu\text{m}$ or less, surface roughness R_a of said surface is $0.5\mu\text{m}$ or less, R_t is $4.0\mu\text{m}$ or less, and R_z is $3.5\mu\text{m}$ or less" (underlined portions are the amendments). In addition, this copper foil is adhered to and laminated on a transparent resin film, and the copper foil is formed into a mesh form with chemical etching for use as a display filter.

Contrarily, Document 1 (JP2003-318596) does not in any way describe the color difference and chroma concerning the blackened layer. Although the Examiner is indicating that it is a matter of design for those skilled in the art to suitably change the "color difference", it is not technically easy to discover a suitable color difference. There are no grounds that those skilled in the art could have easily achieved such suitable color difference.

B) Further, the Examiner is presenting Document 2 (JP2002-341783) concerning the "chroma" that is not described in Document 1. Nevertheless, the display filter pertaining to the invention of Document 2 is obtained by surface printing matting ink having a chroma of 10 or less in a mesh shape on a transparent resin film. And, in order to obtain electromagnetic shielding performance, metallic powder is mixed with the matting ink upon printing. The addition of metallic powder is to provide conductivity for obtaining the

electromagnetic shielding performance.

The copper foil and blackened surface obtained by electroplating according to the present invention and the matting ink printed surface of Document 2 have entirely different materials and structures. One is an electroplated layer and the other is ink. The physical properties (hue, inherent chroma) are clearly different. It would be unacceptable to equate the two. Further, the mesh structure obtained by etching the copper foil and the mesh structure obtained from the matting ink are clearly different.

As described above, the blackened layer obtained by electroplating the copper foil and the matting ink are totally unrelated. Therefore, even from the perspective of "chroma", it would be clearly erroneous to say that the present invention could have been easily achieved based on the combination of Document 1 and Document 2.

C) In claim 1, the purpose of prescribing the surface roughness; specifically, the surface roughness of the blackened surface is to improve the etching characteristics. Etching characteristics are an important feature upon forming the copper foil into a mesh shape with chemical etching for use as a display filter.

In the present invention, the etching characteristics are optimally improved as a result of "the coarsened grains of a processed surface in which one or both surfaces of a copper foil is subject to black treatment being $1\mu\text{m}$ or less, surface roughness Ra of said surface being $0.5\mu\text{m}$ or less, Rt being $4.0\mu\text{m}$ or less, and Rz being $3.5\mu\text{m}$ or less."

Nevertheless, the condition of Ra 0.02 to $1\mu\text{m}$ prescribed in Document 1 is for preventing the mixture of gas pockets between the metal foil and resin, shortening the time of vacuum suction, and simultaneously preventing the rise in reflectivity. This is unrelated to the improvement of etching characteristics.

In addition, there is no description regarding the requirements in the present invention for optimizing the coarsened grain size or surface roughness Ra, Rt, Rz in order to improve the etching characteristics.

As described above, the aim, object, operation and effect of the present

invention and cited Documents 1 and 2 are significantly different. Therefore, it would be erroneous to indicate cited Documents 1 and 2 as grounds for denying the present invention.

5 D) Accordingly, the invention of the present PCT application is clearly different from the cited Documents, and the novelty and inventive step of the present invention should not be denied. We therefore believe that the invention of this PCT application possesses novelty and inventive step.